

**UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549**

FORM S-8

REGISTRATION STATEMENT
UNDER
THE SECURITIES ACT OF 1933

MERCURY COMPUTER SYSTEMS, INC.

(Exact Name of Registrant as Specified in its Charter)

Massachusetts
(State of Incorporation)

04-2741391
(I.R.S. Employer Identification Number)

199 Riverneck Road
Chelmsford, Massachusetts 01824
(978) 256-1300
(Address of Principal Executive Offices)

MERCURY COMPUTER SYSTEMS, INC.
1997 EMPLOYEE STOCK PURCHASE PLAN
(Full Title of the Plan)

Craig Barrows
Vice President, General Counsel
Mercury Computer Systems, Inc.
Chelmsford, Massachusetts 01824
(978) 256-1300
(Name, Address and Telephone Number, Including Area Code, of Agent for Service)

CALCULATION OF REGISTRATION FEE

<u>Title of Securities to be Registered</u>	<u>Amount to be Registered (1)(2)</u>	<u>Proposed Maximum Offering Price Per Share (3)</u>	<u>Proposed Maximum Aggregate Offering Price (3)</u>	<u>Amount of Registration Fee (3)</u>
Common Stock	300,000	\$ 13.04	\$ 3,912,000	\$ 418.59

- (1) This registration statement also covers preferred stock purchase rights (the "Rights") which are presently attached to and trade with the registrant's common stock. Any value attributable to the Rights is reflected in the market price of the common stock.
- (2) In addition, pursuant to Rule 416(a) under the Securities Act of 1933, as amended (the "Securities Act"), this registration statement also covers an indeterminate number of additional shares of common stock to be offered or sold as a result of the anti-dilution provisions of the employee benefit plan described herein, including to prevent dilution resulting from any reorganization, recapitalization, reclassification, stock dividend, stock split or other similar change.
- (3) Calculated in accordance with Rule 457(c) and (h) under the Securities Act solely for the purpose of determining the amount of the registration fee, based on the average of the high and low prices on the NASDAQ Global Select Market on November 28, 2006.

EXPLANATORY NOTE

This registration statement is being filed solely for the purpose of registering 300,000 additional shares of common stock, par value \$.01 per share (the "Common Stock"), of Mercury Computer Systems, Inc. (the "Company") to be offered to participants under the Mercury Computer Systems, Inc. 1997 Employee Stock Purchase Plan, as amended (the "Plan"), originally adopted in 1997 and most recently amended and restated on July 24, 2006 (and approved by the Company's shareholders on November 13, 2006). The maximum number of shares issuable under the Plan is 800,000 shares, of which 500,000 shares were previously registered with the Securities and Exchange Commission (the "Commission") on Form S-8 (File No. 333-53291 filed on May 21, 1998), as adjusted for a 2-for-1 stock split on December 21, 1999 pursuant to Rule 416(a) under the Securities Act. Pursuant to General Instruction E of Form S-8, the contents of that registration statement are incorporated herein by reference, except as otherwise noted below.

PART II

INFORMATION REQUIRED IN THE REGISTRATION STATEMENT

ITEM 3. INCORPORATION OF DOCUMENTS BY REFERENCE.

The following documents are incorporated herein by reference:

- (a) The Company's annual report on Form 10-K for the fiscal year ended June 30, 2006, as filed with the Commission on September 13, 2006;
- (b) The Company's quarterly report on Form 10-Q for the fiscal quarter ended September 30, 2006, as filed with the Commission on November 9, 2006;
- (c) The Company's current reports on Form 8-K filed with the Commission on July 27, 2006 (excluding the information and exhibit furnished pursuant to Item 2.02), August 8, 2006, August 21, 2006, October 5, 2006, October 27, 2006 and November 15, 2006;
- (d) The description of the Company's common stock contained in the Company's registration statement on Form 8-A dated January 7, 1998, as filed with the Commission pursuant to Section 12 of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), including any amendment thereto or report filed for the purpose of updating such description; and
- (e) The description of the Company's preferred stock purchase rights contained in the Company's registration statement on Form 8-A dated December 15, 2005, as filed with the Commission pursuant to Section 12 of the Exchange Act, including any amendment thereto or report filed for the purpose of updating such description.

All documents subsequently filed by the Company pursuant to Section 13(a), 13(c), 14 and 15(d) of the Exchange Act, prior to the filing of a post-effective amendment which indicates that all securities offered hereby have been sold or that deregisters all securities then remaining unsold, shall be deemed to be incorporated by reference herein and to be a part hereof from the date of the filing of such documents.

ITEM 5. INTERESTS OF NAMED EXPERTS AND COUNSEL.

Craig Barrows, Vice President, General Counsel of the Company, has given his opinion on the validity of the Common Stock offered under this registration statement. As of the date of this registration statement, Mr. Barrows owned 13,500 shares of Common Stock, all of which were issued under the Company's 2005 Stock Incentive Plan and are subject to forfeiture under certain conditions.

ITEM 6. INDEMNIFICATION OF DIRECTORS AND OFFICERS.

Section 2.02(b)(4) of Chapter 156D of the Massachusetts General Laws allows a corporation to eliminate or limit the personal liability of a director of a corporation to the corporation or its shareholders for monetary damages for a breach of fiduciary duty as a director notwithstanding any provision of law imposing such liability,

except where the director breached his duty of loyalty, failed to act in good faith, engaged in intentional misconduct or knowingly violated a law, authorized the payment of an improper distribution or obtained an improper personal benefit. The Company has included a similar provision in its articles of organization.

Section 8.51(a) of Chapter 156D of the Massachusetts General Laws provides that a corporation may indemnify its directors against expenses (including attorneys' fees), judgments, fines and amounts paid in settlement reasonably incurred in connection with any litigation or other legal proceeding brought against any director by virtue of his position as a director of the corporation unless he is deemed to have not acted in good faith in the reasonable belief that his action was in the best interest of the corporation. As noted below, the Company has provided for director indemnification in its bylaws.

Section 8.52 of Chapter 156D of the Massachusetts General Laws provides that a corporation must indemnify a director who is wholly successful, on the merits or otherwise, in the defense of any proceeding to which the director was a party because he was a director of the corporation against reasonable expenses incurred by him in connection with the proceeding.

Section 8.56(a) of Chapter 156D of the Massachusetts General Laws ("Section 8.56") provides that a corporation may indemnify its officers to the same extent as its directors and, for officers that are not directors, to the extent provided by (i) the articles of organization, (ii) the bylaws, (iii) a vote of the board of directors or (iv) a contract. In all instances, the extent to which a corporation provides indemnification to its officers under Section 8.56 is optional. As noted below, the Company has provided for officer indemnification in its bylaws.

The Company's bylaws, as amended, provide that, except as limited by law or otherwise provided in the bylaws, each director or officer of the Company (and his heirs and personal representatives) shall be indemnified by the Company against any expense incurred in connection with each proceeding in which he is involved as a result of his serving or having served as a director or officer. The bylaws further provide that no indemnification shall be provided to a director or officer with respect to a proceeding as to which it shall have been adjudicated that he did not act in good faith in the reasonable belief that his action was in the best interests of the Company. The Company will pay sums on account of indemnification in advance of a final disposition of a proceeding upon receipt of an undertaking by the director/officer to repay such sums if it is subsequently established that he is not entitled to indemnification.

The bylaws do not limit the power of the board of directors to authorize the purchase and maintenance of insurance on behalf of any director or officer against any expense whether or not the Company would have the power to indemnify such director or officer against such expense under the bylaws. The Company maintains directors' and officers' liability insurance.

The Company has entered into indemnification agreements with its directors. The indemnification agreements require, among other matters, that the Company indemnify its directors to the fullest extent provided by law and advance to directors certain expenses, subject to reimbursement if it is subsequently determined that indemnification is not permitted.

ITEM 8. EXHIBITS.

<u>Exhibit</u>	<u>Description</u>
4.1	Articles of Organization (incorporated herein by reference to Exhibit 3.1 of the Company's Annual Report on Form 10-K/A for the fiscal year ended June 30, 2002, as filed with the Commission on September 27, 2002).
4.2	Articles of Amendment (incorporated herein by reference to Exhibit 3.2 of the Company's quarterly report on Form 10-Q for the fiscal quarter ended December 31, 2004, as filed with the Commission on February 8, 2005).
4.3	Articles of Amendment (incorporated herein by reference to Exhibit 1 of the Company's registration statement on Form 8-A, as filed with the Commission on December 15, 2005).
4.4	By-laws, as amended through September 22, 2004 (incorporated herein by reference to Exhibit 3.2 of the Company's quarterly report on Form 10-Q for the fiscal quarter ended September 30, 2004, as filed with the Commission on November 1, 2004).

<u>Exhibit</u>	<u>Description</u>
4.5	Shareholder Rights Agreement, dated as of December 14, 2005, between the Company and Computershare Trust Company, N.A. (formerly known as EquiServe Trust Company, N.A.) (incorporated herein by reference to Exhibit 2 of the Company's registration statement on Form 8-A, as filed with the Commission on December 15, 2005).
4.6	Mercury Computer Systems, Inc. 1997 Employee Stock Purchase Plan, as amended and restated through November 13, 2006 (incorporated herein by reference to Exhibit 10.1 of the Company's current report on Form 8-K, as filed with the Commission on November 15, 2006).
5.1*	Opinion of General Counsel.
23.1*	Consent of KPMG LLP.
23.2*	Consent of PricewaterhouseCoopers LLP.
23.3	Consent of General Counsel (contained in the opinion filed as Exhibit 5.1 to this registration statement).
24.1	Power of Attorney (included in signature page to this registration statement).

* Filed herewith

SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, the registrant certifies that it has reasonable grounds to believe that it meets all of the requirements for filing on Form S-8 and has duly caused this registration statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the town of Chelmsford, the Commonwealth of Massachusetts on this 30th day of November, 2006.

MERCURY COMPUTER SYSTEMS, INC.

By: /s/ Robert E. Hult
Robert E. Hult
Senior Vice President and Chief Financial Officer

POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS that each person whose signature appears below constitutes and appoints James R. Bertelli, Robert E. Hult and Alex N. Braverman his true and lawful attorneys-in-fact and agents, each acting alone, with full powers of substitution and resubstitution, for him or in his name, place and stead, in any and all capacities to sign any and all amendments or post-effective amendments to this registration statement (or any registration statement for the same offering that is to be effective upon filing pursuant to Rule 462(b) under the Securities Act of 1933), and to file the same, with all exhibits thereto, and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorneys-in-fact and agents, each acting alone, full power and authority to do and perform each and every act and thing requisite or necessary to be done in and about the premises, as fully to all intents and purposes as he might or could do in person, hereby ratifying and confirming all that said attorneys-in-fact and agents, each acting alone, or his substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Act of 1933, this registration statement has been signed by the following persons in the capacities and on the dates indicated.

<u>Signature</u>	<u>Title</u>	<u>Date</u>
<u>/s/ James R. Bertelli</u> James R. Bertelli	President, Chief Executive Officer and Director (Principal Executive Officer)	November 30, 2006
<u>/s/ Robert E. Hult</u> Robert E. Hult	Senior Vice President and Chief Financial Officer (Principal Financial Officer)	November 30, 2006
<u>/s/ Alex N. Braverman</u> Alex N. Braverman	Vice President, Controller and Chief Accounting Officer (Principal Accounting Officer)	November 30, 2006
<u>/s/ Gordon B. Baty</u> Gordon B. Baty	Director	November 30, 2006
<u>/s/ Albert P. Belle Isle</u> Albert P. Belle Isle	Director	November 30, 2006
<u>/s/ George W. Chamillard</u> George W. Chamillard	Director	November 30, 2006

/s/ Russell K. Johnsen
Russell K. Johnsen

Director

November 30, 2006

/s/ Sherman N. Mullin
Sherman N. Mullin

Director

November 30, 2006

/s/ Lee C. Steele
Lee C. Steele

Director

November 30, 2006

/s/ Vincent Vitto
Vincent Vitto

Director

November 30, 2006

/s/ Richard P. Wishner
Richard P. Wishner

Director

November 30, 2006

EXHIBIT INDEX

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* Filed herewith

November 30, 2006

Mercury Computer Systems, Inc.
199 Riverneck Road
Chelmsford, MA 01824

Re: Securities Being Registered Under Registration Statement on Form S-8

Ladies and Gentlemen:

I am Vice President and General Counsel of Mercury Computer Systems, Inc., a Massachusetts corporation (the "Company"), and am issuing this opinion in connection with the filing of a Registration Statement on Form S-8 (the "Registration Statement"), for the purpose of registering with the Securities and Exchange Commission, under the Securities Act of 1933, as amended (the "Securities Act"), (1) 300,000 shares (the "Shares") of the Company's common stock, par value \$.01 per share (the "Common Stock"), issuable pursuant to the Company's 1997 Employee Stock Purchase Plan, as amended (the "Plan"), and (2) the preferred stock purchase rights which are currently attached to and trade with the Common Stock in accordance with the terms of the Shareholder Rights Agreement dated as of December 14, 2005 (the "Rights Agreement"), between the Company and Computershare Trust Company, N.A. (the "Rights").

In connection with this opinion, I have examined originals or copies, certified or otherwise identified to my satisfaction, of such corporate records of the Company and such other documents, records, certificates and other instruments of officials of the Company, public officials and others as I have deemed necessary or appropriate as a basis for the opinion set forth herein. I have assumed the genuineness of all signatures, the authenticity of all documents submitted to me as originals and the conformity to authentic original documents of all copies submitted to me as conformed and certified or reproduced copies. As to any facts material to the opinion expressed herein which I have not independently established or verified, I have relied upon statements and representations of officers and other representatives of the Company and others.

I am admitted to the practice of law in the Commonwealth of Massachusetts, and I express no opinion with respect to any other laws.

Based on the foregoing, I am of the opinion that the Shares have been duly authorized for issuance by the Company and, upon issuance and delivery against payment therefor in accordance with the terms of the Plan, such Shares will be validly issued, fully paid and nonassessable, and the Rights attached thereto will be validly issued.

I hereby consent to the filing of this opinion as an exhibit to the Registration Statement. In giving my consent, I do not thereby admit that I am included in the category of persons whose consent is required under Section 7 of the Securities Act or the rules and regulations promulgated thereunder.

Sincerely,

/s/ Craig Barrows

Craig Barrows
Vice President, General Counsel

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

The Board of Directors
Mercury Computer Systems, Inc.:

We consent to the use of our report dated September 12, 2006, with respect to the consolidated balance sheet of Mercury Computer Systems, Inc. and subsidiaries as of June 30, 2006, and the related consolidated statements of operations, changes in shareholders' equity and comprehensive (loss) income, and cash flows for the year ended June 30, 2006, and the related financial statement schedule II, which report appears in the annual report on Form 10-K of Mercury Computer Systems, Inc. dated September 13, 2006, and to the use of our report on management's assessment of the effectiveness of internal control over financial reporting and the effectiveness of internal control over financial reporting as of June 30, 2006. Both reports are incorporated herein by reference.

Our report on the consolidated financial statements and related financial statement schedule refers to a change in the method of accounting for stock-based compensation upon the adoption of Statement of Financial Accounting Standards No. 123(R), "Share-Based Payment."

/s/ KPMG LLP

Boston, Massachusetts
November 30, 2006

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in this Registration Statement on Form S-8 of our report dated September 13, 2005 relating to the financial statements and financial statement schedule, which appears in Mercury Computer Systems, Inc.'s Annual Report on Form 10-K for the year ended June 30, 2005.

/s/ PricewaterhouseCoopers LLP

Boston, Massachusetts
November 30, 2006